Can mastitis be eliminated?

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Can mastitis be eliminated from a dairy herd? The results of a 12-month continuous study of four commercial herds show that it could be done.

A mastitis control programme based on simple milking hygiene combined with segregation, treatment and culling on the results of regular field tests, considerably reduced the incidence of mastitis symptoms in each of four commercial herds. Mastitis was all but eliminated in two herds, which had only 1 per cent. infected quarters at the end of 12 months. The removal of one known infected cow in one of these herds would have given a mastitis-free herd on the last examination.

The decreased incidence of mastitis was mainly due to:
- Culling cows affected with chronic mastitis and replacing them with heifers.
- Preventing mastitis from occurring in the majority of cows free of mastitis at the start of the programme, and in replacement heifers. When mastitis did develop, early detection and treatment cured a high percentage of infected quarters.

The four herds
Four dairy farmers with herds in which mastitis was a problem volunteered to adopt a control programme and allow a fortnightly examination of their herds. The herds, designated D, H, P and W, produced whole milk on non-irrigated land, and each had a contract to maintain a whole milk quota throughout the year.

Control measures, including the use of running water to wash udders and back flush the teat cups, had been used in herds H, P and W for the previous 12 months. However, this initial back flushing was judged inefficient in all cases. Herd H had used the Rapid Mastitis Test (R.M.T.) regularly and segregated cows on results of the tests. Herd D used udder cloths for udder and teat cleansing and transferred teat cups directly from one cow to the next.

Staphylococcal bacteria were the main bacteria isolated and in all herds a large percentage of quarters showed chronic damage and hardening. There was a very low incidence of mastitis in first lactation cows, but a high incidence in all other age groups. The problem in all herds was equal to or more severe than that shown for the average herd in the 1965 mastitis survey.

Control programme
The control programme instituted in all herds included:
- Testing and adjusting the milking machine for efficient operation.
- Using running water to clean udders and teats, stimulate milk let-down, and back-flush the teat cups between cows milked.
- Segregating the cows into clean and infected groups. The clean group, to be milked first, consisted of cows with all quarters R.M.T. negative or having positive quarters under treatment. The infected group to be milked last consisted of cows with one or more quarters R.M.T. positive and not under treatment.
Treatment with antibiotics of quarters showing positive R.M.T. results but normal udder tissue at the initial test, and of previously negative quarters that became positive during the programme.

• Culling and replacing cows at the discretion of the owner.

The owner of herd D introduced running water into the dairy and a teat cup back-flushing system so the control programme could be followed. Owners of herds H, P and W altered their teat cups to ensure efficient back-flushing.

The four programmes started within the same month after three preliminary samplings at fortnightly intervals. The programmes were adhered to except in herd W where the owner became ill three months after the start. In the ensuing four months segregation was not maintained in this herd and treatment with intramammary antibiotics in all quarters at drying off was started seven months after the start of the programme. Other minor changes from the programme in all herds were associated with treatment that was sometimes given by the owners between visits, mainly to newly calved cows.

Routine examination

A veterinary surgeon and an assistant visited each herd once a fortnight during milking. They performed and recorded results of the R.M.T. on quarter milk samples from all milking cows and recorded milk and udder abnormalities and any treatment given. They also advised on quarters to be treated, and allocated the group in which each cow was to be milked. Milk samples were collected from each quarter for laboratory examination.

Culling

During the 12 months 99 cows were sold. At the time of sale 72 of these cows had mastitis, with a total of 180 infected quarters. Infected cows were sold early in the programme in herds D and P but in herds H and W culling was gradual and some of the originally infected cows were still in the final herd. Replacements in herds P and H were all home bred but W and D purchased some newly-calved cows.

Treatment

Treatment was restricted to quarters of cows in the clean group in which milk gave a positive R.M.T. It was successful in 90 of the 108 quarters treated. Treatment based on the R.M.T. was considered unnecessary in only eight quarters. Some farmers treated quarters in the infected group which showed clinical signs, but there were no permanent cures.

The rapid mastitis test

The fortnightly R.M.T. result was compared with the laboratory method of counting inflammatory cells associated with mastitis. Of the 16,865 comparisons made, both tests were negative in 13,870 cases and both positive in 1,830 cases. The differences which occurred in the remaining 1,165 cases were either slight or not repeated at later visits. Treatment, segregation, and culling based on the R.M.T. results and clinical findings proved to be soundly based.

Back flushing

The contribution of back flushing in reducing the spread of staphylococci is not known. There was some spread in all herds. In herd H there was considerable spread in the clean group, but the bacteria did not cause mastitis; back flushing may have reduced the number of bacteria which spread from cow to cow to a relatively harmless level.

Segregation

Segregation of cows at milking into clean and infected groups was strictly maintained in all herds except herd W. In the clean group of herd W, when segregation was not maintained, there was considerable spread of bacteria which caused mastitis in previously clean quarters.

When cows were segregated into clean and infected groups the farmers quickly recognised that their clean groups were remaining relatively free of mastitis and they rapidly gained confidence in the programme. Segregation also influenced culling, and all farmers tended to look critically at cows in the infected group.
Segregation seems to have played a very important part in preventing the spread of infection in these herds.

**Findings**

**Table 1—Initial infection in herds**

<table>
<thead>
<tr>
<th>Herd</th>
<th>No. of Cows</th>
<th>Quarters with Mastitis</th>
<th>Quarters hard in texture</th>
<th>Quarters with abnormal milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>38</td>
<td>26 (17%)</td>
<td>20 (13%)</td>
<td>6 (4%)</td>
</tr>
<tr>
<td>H</td>
<td>36</td>
<td>40 (28%)</td>
<td>16 (11%)</td>
<td>8 (5%)</td>
</tr>
<tr>
<td>P</td>
<td>66</td>
<td>28 (11%)</td>
<td>20 (8%)</td>
<td>4 (2%)</td>
</tr>
<tr>
<td>W</td>
<td>58</td>
<td>61 (29%)</td>
<td>24 (11%)</td>
<td>18 (8%)</td>
</tr>
</tbody>
</table>

**Table 2—Final mastitis position**

<table>
<thead>
<tr>
<th>Herd</th>
<th>No. Cows</th>
<th>No. with 1%</th>
<th>1%</th>
<th>1%</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>33</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>31</td>
<td>9</td>
<td>7%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>P</td>
<td>72</td>
<td>4</td>
<td>1%</td>
<td>3%</td>
<td>0</td>
</tr>
<tr>
<td>W</td>
<td>51</td>
<td>25</td>
<td>12%</td>
<td>6%</td>
<td>3%</td>
</tr>
</tbody>
</table>

**Discussion**

The control programme restricted mastitis in cows free of the disease at the start of the programme and in newly calved heifers. At the start of the programme there were 41 cows in second lactation and 35 quarters with mastitis. Final herds had 54 cows in second lactation and only seven quarters with mastitis. The latter group of cows had been in first lactation at the start of the programme, with a low incidence of mastitis (five quarters) and had remained relatively free of the disease.

The individual contributions of back flushing, culling, segregation, and treatment in reducing the incidence and spread of mastitis are difficult to evaluate but all appeared to play a significant part. Herds D and P, in which most of the infected cows were culled early in the programme, achieved the best control and had the lowest final incidence of mastitis. The only herd in which segregation was not maintained as recommended was herd W. In this herd there was a considerable spread of staphylococci to clean cows. Herd W also had the highest final incidence of mastitis.

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